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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,057	03/26/2004	Thomas W. Sederberg	22477	9540

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EXAMINER
PAPPAS, PETER

ART UNIT	PAPER NUMBER
2628	

DATE MAILED: 05/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
	10/811,057	SEDERBERG, THOMAS W.
Office Action Summary	Examiner	Art Unit	
	Peter-Anthony Pappas	2628	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>03 March 2006</u>.

2a)☐ This action is **FINAL.**   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-7 and 9-23</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-4, 7, 9-12, 15, 18-20 and 22</u> is/are rejected.

7)☒ Claim(s) <u>5,6,13,14,16,17 and 21</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>26 March 2004</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Allowable Subject Matter

1.   Claims 5-6, 13-14, 16-17 and 21 are objected to as being dependent upon a

rejected base claim, but would be allowable if rewritten in independent form including all

of the limitations of the base claim and any intervening claims.

Claim Objections

2.   Claims 12-15 are objected to because of the following informalities: said

respective claim language refers to a cubic spline and should instead refer to a bi-cubic

spline. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of
> making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the
> art to which it pertains, or with which it is most nearly connected, to make and use the same and shall
> set forth the best mode contemplated by the inventor of carrying out his invention.

4.   Claim 23 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply

with the written description requirement. The claim(s) contains subject matter

(generating a ray from the single control point in each of four directions on the control

mesh to the two nearest edges of the control mesh in order to infer local knot vectors for

control points and inferring basis functions for the control points using said knot vectors)

which was not described in the specification in such a way as to reasonably convey to

one skilled in the relevant art that the inventor(s), at the time the application was filed,

had possession of the claimed invention (Specification, p. 12, lines 4-12).

Claim Rejections - 35 USC § 102

5.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6.   Claims 1-4, 7, 9-12, 18-20 and 22 are rejected under 35 U.S.C. 102(b) as being

anticipated by Bakenov (T-Splines: Tensor Product B-Spline Surfaces with T-Junctions).

7.   In regards to claim 1 Bakenov teaches a method for defining a bi-cubic spline

surface in a computing environment, comprising the steps of: creating a control mesh

with a substantially rectangular structure (p. 27, Fig. 2.23, § 2.9) and allowing T-

junctions in at least one parameter direction (p. 40-42, § 4.1; p. 53-59, § 4.3); inferring

from the control mesh tensor product B-spline surface basis functions (p. 26, § 2.9,

Equation 2.8) for each control point (P_{ij}); and computing a surface based on the basis

functions and the control mesh (p. 26-28, § 2.9; p. 53-59, § 4.9). It is noted that said

language "...allowing T-junctions in at least..." is not considered to limit said claim to

require that T-junctions be present in said control mesh.

8.   In regards to claim 2 Bakenov teaches utilizing a set of non-hierarchical set of

rules (p. 32-33, § 3.1). It is noted that the respective claim language comprises open-

ended claim language (i.e. "...comprising..." – line 1) and thus "...one non-hierarchical

set of rules" is consider to read on at least one non-hierarchical set of rules.

9.   In regards to claim 3 Bakenov teaches a method for locally refining (p. 16, § 2.6,

¶ 2) a control mesh of a bi-cubic spline surface in a computing environment, comprising

the steps of: defining a control mesh having a substantially rectangular structure;

inserting a single control point into a pre-image of the control mesh to form a T-junction

(p. 53-59, specifically Fig. 4.8, § 4.3; p. 69-70, Figs. 5.2-5.5, § 5.2); and computing the

Cartesian coordinates of the control points and of the neighboring control points (p. 57-

58, Step 5, § 4.3) such that the bi-cubic spline surface is not geometrically altered

(Abstract, ¶ 1; p. 13, § 2.3; p. 53-59, § 4.3; p. 65-73, § 5.2). Bakenov teaches that in

the knot insertion process, a knot is added to the knot vector of a given B-spline. This

results in an additional control point and a modification of a few existing control points.

The end result is a curve defined by a larger number of control points, but which defines

exactly the same curve as before knot insertion (p. 16, § 2.6).

10.   It is noted that the respective claim language comprises open-ended claim

language (i.e. "...comprising..." – line 2) and thus "...inserting a single control point..." is

not considered to limit said claim to require that only one control point be inserted into

said control mesh.

11.   In regards to claim 4 Bakenov teaches splitting basis functions (p. 21-25, § 2.8.1)

which have fewer knots than are called for by the control mesh (p. 68, step 2, § 5.2);

and adding control points to the control mesh in locations where basis functions have

more knots than are called for by the control mesh (p. 68, step 3, § 5.2).

12.   In regards to claim 7 see p. 65-73, § 5.2, specifically Figs. 5.6-5.10. It is noted

that said language "...having control meshes that are allowed to contain T-junctions..."

is not considered to limit said claim to require that T-junctions be present in said control

mesh.

13.   In regards to claim 9 Bakenov teaches defining bi-cubic spline surfaces that

provides local refinement to control meshes, using T-junctions in either or both

parameter directions, in a computing environment (p. 53-59, Fig. 4.8, § 4.3), comprising

the steps of: specifying knot intervals associated with the spline control mesh; imposing

a local knot coordinate system based on the knot interval (p. 18-21, § 2.8); inferring

local knot vectors for control points in order to produce basis functions for the control

points (p. 5-6, § 2.1); and inserting a single control point into the control mesh without

altering the bi-cubic spline surface (p. 16, ¶ 2, § 2.6). It is noted that it is considered

that at least one control point must be inserted or removed from a mesh to form a T-

junction (p. 3, § 1.1, Fig. 1.2).

14.   In regards to claim 10 Bakenov teaches permitting partial rows of control points

terminating in a T-junction (p. 54, § 4.3).

15.   In regards to claim 11 Bakenov teaches assigning local knot coordinates to the

pre-image of each control point (p. 65-67, § 5.2).

16.   In regards to claim 12 the rationale disclosed in the rejection of claims 9 and 10

are incorporated herein.

17.   In regards to claim 18 Bakenov teaches that for a valid T-mesh, the bicubic T-

spline surface consists of a set of bicubic patches. The domain of each patch

corresponds to each interior face in the T-mesh after each T-point has been extended

over two bays. The main task is now to define an appropriate 4 x 4 mesh for each

patch. The basic requirement is that when these T-points are generated from a B-spline

surface by knot insertion or knot removal, the T-spline surface should be the same as

the original B-spline surface. Therefore our scheme relies heavily on the polar values of

the B-spline surface (p. 55-56, § 4.3). Bakenov further teaches choosing the knot

interval for the local knot insertion such that pairs of zero knot intervals separate each

pair of adjoining domains (p. 33, ¶ 3, § 3.1).

18.   In regards to claims 19-20 see p. 29, § 2.9.1; p. 65-73, § 5.2.

19.   In regards to claim 22 see p. 3, § 1.1; p. 58-59, § 4.3.

Claim Rejections - 35 USC § 103

20.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was
> made.

21.   Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bakenov

(T-Splines: Tensor Product B-Spline Surfaces with T-Junctions), as applied to claims 1-

4, 7, 9-12, 18-20 and 22, in view of Adobe Developer Association (Smooth Shading),

herein referred to as Adobe.

22.   In regards to claim 15 Bakenov fails to explicitly teach the step of applying

shading to the cubic spine mesh that can be viewed by an end user. Adobe teaches

that smooth shading can be used to accurately describe image information which is

displayed via a screen (p. 13; p. 16). Adobe teaches that the ShadingType 7 shading

method is almost identical to ShadingType 6, except that instead of using a bicubic

Coons patch defined by twelve control points, a bicubic tensor product patch defined by

sixteen control points is used. The extra control points allow for more control of the

color interpolation across the patch (p. 47; p. 55). It is noted that said image information

displayed via a screen is considered to be viewed by a user.

It would have been obvious to one skilled in the art, at the time of the Applicant's

invention, to incorporate the teachings of Adobe into method taught by Bakenov,

because such incorporation would provide a means by which to more accurately

present graphical image information for display.

Response to Arguments

23.   The prior objection to claim 19 has been withdrawn in lieu of Applicant's remarks.

24.   In response to Applicant's remarks in regards to claims 1-4, 7-11, 18-20 and 22

the Applicant is directed to the respective rejections above, which have been modified

accordingly to address said remarks.

25.   Applicant's remarks have been fully considered, but are not deemed persuasive.

Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Peter-Anthony Pappas whose telephone number is 571-

272-7646. The examiner can normally be reached on M-F 9:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Ulka Chauhan can be reached on 571-272-7782. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

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you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Peter-Anthony Pappas
Examiner
Art Unit 2628

PP

ULKA CHAUHAN
SUPERVISORY PATENT EXAMINER